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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/864,650	05/23/2001	Ryushin Omasa	2551-84	3773

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EXAMINER

LEADER, WILLIAM T

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 05/21/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/864,650

Applicant(s)

OMASA, RYUSHIN

Examiner

William T. Leader

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-11 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Independent claim recites that the vibrational vanes are fixed in "one-stage or multi-stage style" to a vibrating rod". This limitation does not appear to have been described in the specification.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The scope of the limitation fixed in "one-

stage or multi-stage style to a vibrating rod". It is not clear what a "one-stage" style or a "multi-stage style" is.

*Claim Rejections - 35 USC § 103*

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Omasa (6,123,815) in view of Lashmore (4,461,680).

7. The Omasa patent is directed to a method and apparatus for electroplating which is particularly effective in forming deposits in small openings. The method may be used to plate a printed wiring board which has openings with a diameter of 0.01 mm (10  $\mu$ m) (column 3, line 61 to column 4, line 5). Vibrational flow is induced in the plating bath by vibrating vanes fixed in one-stage or multistage to a vibrating bar which interlocks with a vibration generating means (column 3, lines 9-12). The object to be plated, called the plating target, is fixed to cathode bar/suspending member 5. Anode 6 is also placed in the plating bath. See figure 1.

8. Instant claim 1 differs from the process disclosed by Omasa by reciting the use of pulsed plating current. The Lashmore patent is directed to a process for

electroplating. Lashmore discloses that electroplating can be performed by direct current, but that deposits with significantly improved morphology can be obtained using pulsed current deposition (column 5, lines 27-29, 39-40). Lashmore discloses that there are four variables that are of primary importance in pulse plating. These include 1) pulse height (peak current density); 2) base height (off time current density); 3) on time; and 4) off time (column 5, lines 45-48). Figure 1 is an illustration of a pulsed current waveform. The peak current density is  $25 \text{ A/dm}^2$  while the dashed line shows a base current density of  $5 \text{ A/dm}^2$ . Thus, Lashmore discloses the use of a plating current with a first value which is five times larger than a second value of the same polarity as recited in instant claim 1. Another important parameter is the duty cycle which is defined by the on time (peak current density) divided by the sum of the on time and off time (base current density). Ranges for the process variables are given in the table in column 7. The duty cycle ranges from 20-80%. This range includes a first time during which peak current is applied that is three or more times longer than a second time during which base current is applied as recited in claim 1.

9. Features of dependent claims 2-9 are suggested by the Omasa and Lashmore patents. Dependent claims 2 and 3 are directed to values of current and time. These values fall within or overlap those disclosed by Lashmore in the table in column 7.

10. Claim 4 is directed to the amplitude at which the vanes are vibrated and the vibration frequency. Omasa discloses that the vanes may be vibrated at an amplitude of 0.5 to 3.0 mm at a frequency of 200 to 800 time per minute (column 2, lines 46-50). These ranges fall within the ranges recited in claim 4. Claim 5 recites a three-dimensional flow rate. Since the amplitude and frequency of vibration taught by Omasa is the same as that used by applicant, the three-dimensional flow rate would be expected to be the same.

11. Claim 6 is directed to the vibration rate of the vibration generating means. Omasa discloses that the vibration motor vibrates at a frequency of 10 to 500 Hz (column 3, lines 12-14). This is the same rate recited in claim 6.

12. Claim 7 is directed to the amplitude and frequency at which the plating target article is vibrated. Omasa discloses that the plating target is vibrated at a frequency of 100-300 time per minute (column 2, lines 54-56) and column 4, lines 44-45). This is the same range recited in claim 7. Omasa further discloses that the amplitude at which the plating target is vibrated may be from 0.5 to 1.0 mm (column 2, lines 54-56). This range falls within the range recited in claim 7.

13. Claim 8 is directed to the width and frequency at which the plating target is swung. Omasa discloses that the plating target is swung at an amplitude of 10 to 100 mm at a frequency of 10 to 30 times per minute (column 2, lines 52-54). These are the same ranges recited in claim 8.

14. Claim 9 recites that the face of the plating target article has a microstructure less than 50 $\mu$ m. As noted above, Omasa discloses that the method may be used to plate a printed wiring board which has openings with a diameter of 0.01 mm (10  $\mu$ m) (column 3, line 61 to column 4, line 5). This size falls within the range recited in claim 9.

15. The prior art of record is indicative of the level of skill of one of ordinary skill in the art. It would have been obvious at the time the invention was made to have utilized pulse plating as taught by Lashmore in the vibration plating process disclosed by Omasa because deposits with improved morphology would have been formed.

16. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Omasa in view of Lashmore as applied to claims 1-9 above, and further in view of *The Electroplating Engineering Handbook*.

17. Claims 10 and 11 further differ from the process of Omasa by reciting plating a plurality of articles in a holding container. As shown by the handbook, barrel plating is a common procedure for plating a plurality of small parts. See pages 565 to 573. It would have been obvious to have used a barrel as disclosed by the handbook in the process Omasa because the barrel would have allowed a number of loose parts to have been plated simultaneously.

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The article "On-off plating puts down dense, fine-grained finishes" by John Mock discloses advantages resulting from the use of pulse plating in place of steady direct current plating.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William T. Leader whose telephone number is 703-308-2530. The examiner can normally be reached on Mondays-Thursdays and alternate Fridays, 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 703-308-1146. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.



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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

*WL*  
William Leader  
May 15, 2003

*R-11*  
ROY KING  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700